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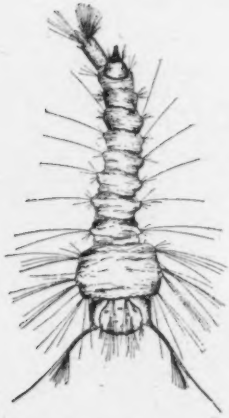

Larva or Culex perturbans as described by Dr. John B. Smith.

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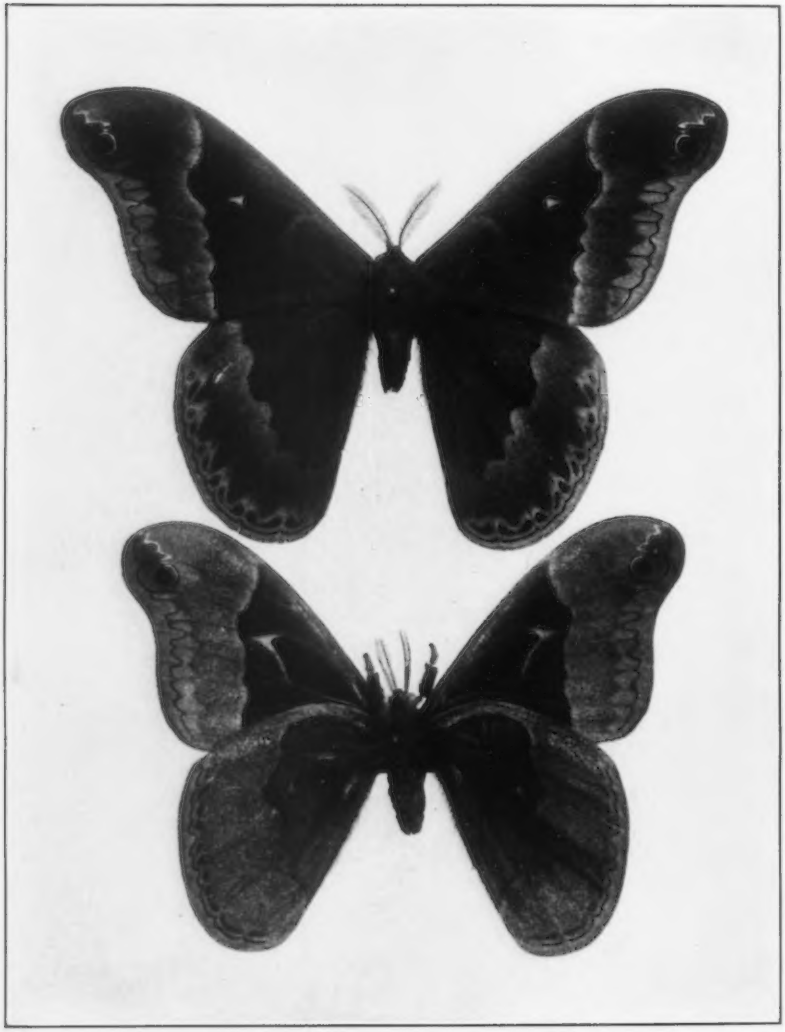


JONES ON CALLOSAMIA CAROLINA.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XX. FEBRUARY, 1909. No. 2.

CONTENTS:

Jones—Additional Notes on Callosamia carolina 49
Kearfoot—Synonomy of Certain Tortricidæ 52
Williams—Notes on the Life-Histories of Certain Wood-Boring Lepidoptera. 58
Williams—The Butterflies and some of the Moths of the Mt. Shasta Region 62
Hood (corrections)—Two New North American Phloeothripidae 75
Biederman—A New Catocala from Ariz. 76
Williamson—Some Corrections in Somatochlora (Odonata—Dragonflies) 77
Webster—The Distribution of the North American Species of Phytonomus (Coleoptera) 80
Beutenmuller—Descriptions of Three New Sesiidae 82
Gerhard—Bibliography on Flies and Mosquitoes as Carriers of Disease. 84
Editorial 90
Notes and News 91
Doings of Societies 93
Obituary—Samuel Auxer 96

Additional Notes on Callosamia carolina.

By FRANK MORTON JONES, Wilmington, Delaware.

(Plates III, IV)

A brief description of an interesting form of *Callosamia angulifera* was published in ENTOMOLOGICAL NEWS for May, 1908 (page 231). It is now possible to give an illustration of this moth and of its cocoons, which differ remarkably from those of typical *angulifera*. I first found these cocoons in May, 1907, in Berkeley County, South Carolina. At that time eleven cocoons were found, all hanging on swamp-magnolia or bay-trees (*Magnolia glauca*); all of these cocoons were empty, and were so evidently different from any of our well-known species that I made every effort to procure eggs, larvae, or live cocoons. Early in 1908 I finally secured thirty live cocoons and many more empty ones, all gathered within four miles of the original locality and from the same food-plant, *Magnolia glauca*.

The cocoon of *carolina* bears a superficial resemblance to that of *polyphemus*, though it is not so regularly rounded or nearly so firm in texture outwardly; for unlike *polyphemus* it is double, the firm inner cocoon being no larger than a large *promethea*, and like that species, open at the top with converging threads. The cocoon is suspended by a strong, slender

thread or stem varying from a fraction of an inch to four inches in length, about two inches being most usual. The outside dimensions are: Length, two to two and a half inches; diameter, about one and a quarter inches. The silk is pale in color and lustrous, and the outside of the cocoon usually has several large magnolia leaves irregularly attached. From *angulifera* it differs in size, in its looser texture outwardly, in its much more decidedly double character, and in the possession of a stem,—evidently a rare character in *angulifera*.

The moths from these cocoons emerged April 1st to 21st, fourteen males and fifteen females. They exhibit very little variation among themselves and present constant differences from any *angulifera* I have been able to see, as is apparent from the description (Ent. News, XIX, page 231) and the illustration herewith. One of the females was mated, and from April 12th to 17th she deposited 191 eggs. The eggs, laid in irregular rows, are similar in size and appearance to those of *angulifera*. A few hours after being deposited they are chalky white in color, sometimes irregularly splotched with brown, evidently stained with the fluid by which they are attached to the leaf. At out-of-door temperature they began to hatch April 19th, some being delayed until May 12th by a spell of cold, wet weather. *Magnolia glauca* not being procurable near Wilmington, Delaware, when they hatched, the young larvae were tried with another species of magnolia, with sassafras, spice-bush, wild cherry, and tulip-tree. They refused all but the last named. On tulip-tree out of doors, they all succumbed to a cold rain; a few, fed indoors, survived through all the larval molts. They showed considerable color variation, and as direct comparison was impossible, no character was detected to separate them positively from the larva of *angulifera*.

The newly hatched larvae are yellow with two narrow black rings on segments T_2, A_1 inclusive, and one on each of the remaining segments. The clusters of setae on the first thoracic and last abdominal segments are black; the median cluster on A_8 is dark, and all the rest are yellow. The head is black with a white band across the front and a white spot on either side above. Feet black.

Second larval stage.—But little changed except in size; the light markings on the head are broader and pale yellow in color.

JONES ON CALLOSAMIA CAROLINA.

Third larval stage.—Yellow, ringed with black as before; whitish between the segments. Head yellowish-green; a black band above the mouth parts, a black band across the front not quite joining another on each side. Feet yellow. Lateral warts on T_1 yellow; the remaining ones on this segment, those on A_{10}, and the lateral warts on A_8, black. On all the other segments the warts usually yellow; sometimes the submedian row yellow, the others black; sometimes the corresponding warts on one side yellow, on the other side black.

Fourth larval stage.—Bluish-white, powdery, with the black transverse lines confined to the dorsal area and fading out as the larva grows. Head yellowish green banded with black as before, the bands narrower. Feet yellow. Anal plate and claspers yellow with a black band and black horseshoe mark. The large dorsal tubercles on T_2 and T_3 spined, orange-color becoming red later, and ringed with black at base. Median wart on A_8 large spined, pale, yellow ringed with black at base. All the remaining warts black, and spined or roughened, the submedian rows more prominently so; except on the thoracic segments, the lateral rows, although slightly spined, approach the smooth shining appearance of the next stage. Occasionally some variation in the color of the warts, the submedian row on the abdominal segments in some examples yellow instead of black.

Fifth larval stage.—Color as before; no trace of the black rings. Head yellow, the black bands still narrower and interrupted. Feet yellow. Anal plate edged with yellow and black. Anal claspers green with a black hollow triangle. Dorsal tubercles on T_2 and T_3 smooth, coral-red, yellow at base with a black ring. Median tubercle on A_8 yellow with a black ring at base. All the other tubercles black, rounded, smooth and shining. A black spot over each abdominal foot. In this and the preceding stage the substigmatal ridge is prominent, but not differing noticeably in color from the other portions. No measurements are given in the above descriptions, but the sizes are approximately those of *promethea*. The moths, especially the males, are smaller and slighter than typical *angulifera* and but little above the average size of *promethea*.

I have not been able to learn anything further of the distribution of this form, or whether it intergrades with typical *angulifera*. Its abundance locally and the persistence of its differences from *angulifera* through all obtainable examples seem to indicate a well defined local race. Co-types and specimens of the cocoons are in my own collection and also in those of Dr. William Barnes, of the Academy of Natural Sciences, Philadelphia, and of the U. S. National Museum (Accession No. 48,676).

Synonomy of Certain Tortricidae.

By W. D. KEARFOOT, Montclair, N. J.

While collecting data for a review of this sub-family, I recently read a series of papers by the late Chas. G. Barrett in the "Entomologist's Monthly Magazine," entitled "Notes on British Tortrices;" of particular interest were certain remarks on pp. 35 and 36, Vol. xxiv, 1887, wherein Mr. Barrett calls attention to four names that had been recently expunged from the British lists, as representing North American species.

These remarks may be quoted in full for the benefit of North American students.

"In Mr. Shepherd's collection are also several of the original types, on the faith of which species were included in our fauna, which were afterwards expunged as aliens. They all appear in Stephens' British Museum Catalogue, but only as reputed British species, and with the locality, "North America?" These specimens are carefully labelled as follows:

"Peregrinana"

"Obliquana, Bent."

"These names appear in Stephens' Catalogue, page 90, and *obliquana* is figured very accurately by Mr. Humphreys (W. and H., Vol. ii, pl. 80, fig. 8). I believe this species to be *Pandemis albariana* Walk., a native of North America. It agrees very well with the figure in Lord Walsingham's work on North American *Tortricidae,* plate 62, fig. 10."

"*'Trileucana'*.—This is *Ptycholoma persicana,* Fitch (*blandana* Clemens, *fragariana* Packard), agreeing well with North American specimens sent me some years ago by Professor Fernald, of Maine State College. In Stephens' list, p. 90, *Croesia trileucana.*

"*'Biustulana'* (two specimens).—This is figured in Westwood and Humphreys' work (Vol. ii, pl. 80, fig. 10). Stephens says of it that he has seen only two specimens, which he believes came from the West of England. He might well have said *farther* west. It is *Ptycholoma melaleucana* Zeller, from Virginia, Maine, Pennsylvania and Ohio. It is well figured

by Lord Walsingham (pl. 62, fig. 8), and agrees with my types from Professor Fernald."

"'*Flavofasciana*.'—This moth is figured under the same name by Humphreys (W. and H., Vol. ii, pl. 99, fig. 16), with the statement—'From Mr. Stone's collection, now in the cabinet of Mr. Bentley.' From Mr. Bentley's cabinet it passed to Mr. Shepherd's. It is *Sericoris instrutana* Clemens, from North America, and agrees with types from Prof. Fernald, sent as *Exartema fasciatana*."

The following synonomy is arranged to the best of my ability, but with the limitations of one unfamiliar with the class of work; I sincerely hope that should there be errors, they will be promptly corrected.

Olethreutes flavofasciana Westwood.
Rhyacionia flavofasciana West. & H., Br. Moths, II, 173, pl. 99, p. 16, 1844.
Sericoris flavofasciana Stph., List B. M., X, 95, 1852.
Rhyacionia flavofasciana West. & H., Br. Moths, 2d Ed., II, 173, pl. 99, p. 16, 1857.
Exartema fasciatana var. (?) Clem., Pro. Ac. N. Sc., 357, 1860.
Sericoris instrutana Clem., Pro. Ent. Soc. Ph., V, 135, 1865.
Sericoris poana Zell., V. Z.—b. Ges. Wien, XXV, 282, 1875.
Sericoris instrutana Fern., Tr. A. E. S., X, 35, 1882.
Sericoris flavafasciana Barrett, Ent. Mo. Mag., XXIV, 36, 1887.
Olethreutes instrutana Fern., Bull. 52, U. S. N. M., No. 5064, 1902.
Olethreutes instrutana Kearf., Smith's List, Lep. No. Am., No. 5467, 1903.

Mr. Barrett says of this species "It is *Sericoris instrutana* Clem. from North America, and agrees with types from Prof. Fernald sent as *Exartema fasciatana*." In Westwood's British Moths, both editions, the figures are more like *instrutana*, while the rather full description is undoubtedly of this species rather than *fasciatana*, hence I prefer to follow Barrett as Fernald did not seem able to separate the two species, though belonging to different genera; hence *flavofasciana* Westw. will take the place of *instrutana* Clem.

Archips schreberiana Stephens.
Lozotaenia schreberiana (?) Stph., Cat. Br. Ins., II, 172, No. 6879, 1829.
Lozotaenia schreberiana Stph., Ills. Br. Ins., Haus., IV, 81, 1834.
Lozotaenia schreberiana Wood, Ind. Ent., No. 875, 1839.

Lozotaenia schreberiana Westwd., Br. Moths, II, 114, pl. 80, p. 20, 1844.
Sericoris trileucana Doubleday, Zoologist, V, p. 1729, 1847.
Croesia (?) *trileucana* Stph., Cat. Br. Ins., X, 90, 1852.
Croesia persicana Fitch., 3d Rept. Ins., N. Y., 357, 1856.
Lozotaenia schreberiana Westwd., Br. Moths, 2d Ed., II, 114, pl. 80, p. 20, 1857.
Ditula (?) *blandana* Clem., Pro. Ent. Soc. Ph., III, 515, 1864.
Lozotaenia fragariana Pack., Guide St. Ins., 335, 1869.
Tortr. (*Argyrot*) *conigerana* Zell., V. Z.—b. Ges. Wien, XXV, 227, 1875.
Ptycholoma persicana Fern., Tr. A. E. S., X, 14, 1882.
Ptycholoma trileucana Barrett, Ent. Mo. Mag., XXIV, 35, 1887.
Archips persicana Fern., Bull. 52, U. S. N. M., No. 5379, 1902.
Archips persicana Kearf., Smith's List, Lep., No. Am., No. 5796, 1903.

I feel considerable doubt of the correctness of the synonomy of this species. Stephens and the earlier authors give earlier references in the works of Linne (Gmelin Ed. xiii), Panzer (Fauna Insectorum Germaniae), etc., usually accompanied by interrogation marks. Doubleday, in Zoologist, 1847, says under heading of *L. schreberiana.* "This species bears no resemblance to the *Tortrix schreberiana* (Linn.), except in having a white costal spot: it is *Sericoris trileucana* (Gm.), a common American species." This remark is repeated in the second edition of Westwood's British Insects, but does not occur in the first. I have carefully examined all of the available editions of Linne, and find nothing that convinces me that either he or Gmelin were acquainted with the American species, but that all of their references were of the European species now known as *Olethreutes schreberiana* L., Staudinger & Rebel Cat. No. 1856.

If this presumption is correct, Stephens is responsible for the first notice and description of the American insect. Westwood's figures, especially good in the first edition, are undoubted representations of our common *persicana.*

Archips biustulana Stephens.
Lozotaenia biustulana Stph., Cat. Br. Ins., II, 171, 1829.
Lozotaenia biustulana Stph., Ills. Br. Ent., Haus., IV, 78, 1834.
Lozotaenia biustulana Wood., Ind. Ent., No. 867, 1839.
Lozotaenia biustulana Bentley, Zoologist, III, p. 1001, 1845.

Lozotaenia biustulana W. & H., Br. Moths II, 113, pl. 80, p. 10, 1851.
Lozotaenia biustulana Stph., List B. M., X, 90, 1852.
Lophoderus melaleucanus Walk., Cat. Lep. Het. Br. Mus., XXVIII, 335, 1863.
Conchylis invexana Walk., Cat. Lep. Het. Br. Mus., XXVIII, 358, 1863.
Ptycholoma (?) *semifuscana* Clem., Pro. Ent. Soc. Phil., III, 519, 1864.
Tortrix melaleucana Rob., Tr. Am. Ent. Soc., II, 271, pl. 4, p. 29, 1869.
Tortrix (*Ptychol.*) *melaleucana* Zell., V. Z.—b. Ges. Wien, XXV, 223, 1875.
Ptycholoma melaleucanum Wlsm., Ills. Lep. Het., B. M., IV, 10, pl. 62, f. 8, 1879.
Ptycholoma melaleucana Fern., Tr. A. E. S., X, 14, 1882.
Ptycholoma biustulana Barrett, Ent. Mo. Mag., XXIV, 35, 1887.
Archips melaleucana Fern., Bull. 52, U. S. N. M., No. 5380, 1902.
Archips melaleucana Kearf., Smith's List, Lep. No. Am., No. 5797, 1903.

Both Wood and Westwood's figures of this species, are very poor in execution, although they bear a resemblance to *melaleucana;* the best evidence for restoring Stephen's name, is Barret's statement that he had compared it (Stephen's specimen) with types of *melaleucana* sent by Fernald, and that it was the same species.

Pandemis obliquana Fab.?
Pyralis obliquana Fabricius (?), III b. 257.
Lozotaenia obliquana Stph., Cat. Br. Ins., II, 171, 1829.
Lozotaenia obliquana Bentley, Zoologist, III, 1001, 1845.
Tortrix obliquana Haw (?)
Lozotaenia obliquana Westwd. & Humph., Br. Moths II, 113, pl. LXXX, p. 8, 1851.
Lozotaenia obliquana Stephens, Catal, Br. Ins. II, 171, No. 6868, 1829.
Lozotaenia obliquana Stephens, Ill. Br. Ent., Haus., IV, 77, 1835.
Lozotaenia obliquana Wood., Ind. Ent., No. 865, 1839.
Paramesia peregrinana Stephens, List, B. M., X, 90, 1852.
Teras albaniana Walk., Cat. Br. Mus., XXVIII, 288, 1863.
Pandemis albaniana Wlsm., Ill. Lep. Het., B. M., IV, 11, pl. 62, f. 10, 1879.
Pandemis obliquana Barrett, Ent. Mo. Mag., XXIV, 35, 1887.
Pandemis albaniana Fern., Tr., A. E. S., X, 14, 1882.
Pandemis albaniana Fern., Bull. 52, U. S. N. M., No. 5393, 1902.
Pandemis albaniana Kearf., Smith's List, B. Am., No. 5810, 1903.

I have not seen Haworth's or Fabricius' note on this insect, it is probable the latter did not have an American specimen before him, but I have little doubt that Stephens described and

Westwood figured the species that we have known as *albaniana* Walk., so that *obliquana* will replace this name, although some doubt remains as to whether the author is Fabricius or Stephens.

In addition to the four species above, for which we are entirely indebted to Mr. Barrett, for straightening out the synonomy, I make record of the following notes on other possibly overlooked names of American Tortricids, so that we may have a reference something less than a century old.

From the English translation of Linne, entitled,

SYSTEMA NATURAE by Sir CHAS. LINNE, AMENDED and ENLARGED by the IMPROVEMENT and DISCOVERIES of LATTER NATURALISTS and SOCIETIES. By WILLIAM TURTON, M. D. Vol. III, London 1802.

The Section heading on page 342 is:—

"Pyralis. Tortrix of Gmelin."

P. 345. *Lactana.* Wing cinereous; upper pair with scattered black dots.
Inhabits *Georgia.*
Body small snowy; *lower wings* snowy with a small black mark at the hind margin.

P. 348. *Margana.* Wings chestnut-brown, with a yellow outer margin in which are 2 chestnut-brown bands.
Inhabits *American Islands.*
Head and *thorax* variegated; *breast* and *legs* snowy; *upper wings* with a small ring in the middle, angle of the tail brownish.

P. 348. *Triangulana.* Wings varied yellow and brown with a yellow base and marginal spots.
Inhabits *American Islands.*
Lower wings cinereous.

P. 351. *Badierana.* Wings yellowish with two white waved streaks.
Inhabits *American Islands.*
Lower wings whitish.

P. 352. *Criseana.* Wings grey-brown, the tip darker with a white marginal spot.
Inhabits *American Islands.*
Wings terminating in a white streak.

P. 356. *Sulphurana.* Wings yellow with two indented oblique brown streaks and numerous flecks.
Inhabits *North America.*
Body yellow; *abdomen* white; *lower wings* snowy; beneath all white.

The first five descriptions do not, at present suggest to me any of our known species; by "American Islands," I assume the West Indies are meant, although Walsingham seems to have entirely overlooked these species in his two papers on West Indian Micro-Lepidoptera. The last is certainly a perfect, condensed description of *sulfureana* Clemens, and unless further evidence is forthcoming to prove the contrary, Dr. Turton or Fabricius will succeed Clemens as the author, but fortunately, with little change in name. Incidentally, it may be worth while for students in the Macro-Lepidoptera as well as in the lower Tineids to consult this work, as American references are not restricted to the Tortricids.

Mr. A. Busck is responsible for the following change of name, and I am indebted to him for calling my attention to the error of Walker, which he discovered, while examining Walker's American types in the British Museum.

Platynota idæusalis Walker.
Hypena (?) *idaeusalis* Walk., Cat. Br. Mus., XIX, 839, 1859.
Platynota sentana Clem., Pr. A. N. Sci. Ph., 348, 1860.
Tortrix sentana Rob., Tr. Am. Ent. Soc. II, 277, 1869.
Tortr. (*Platyn.*) *sentana* Zell., V. Z.—b. Ges. Wien., XXV, 235, 1875.
Bomolocha idaeusalis Dyar., Bull. 52, U. S. N. M., No. 3078, 1902.
Platynota sentana Fern., Bull. 52, U. S. N. M., No. 5387, 1902.
Bomolocha idaeusolis Smith, Smith's List, Lep. No. Am., No. 3310, 1903.
Platynota sentana Kearf., Smith's List, Lep. No. Am., No. 5804, 1903.

Prof. Smith suspected this species to belong to the Tortricidae as evidenced by foot-note on page 60 of his 1903 list.

In Syst. Eleotheratorum, Tornus 1, page 138, 1801, Fabricius uses the generic name *Platynotus*, as a genus in Coleoptera; whether this invalidates Clemens' *Platynota* I prefer to leave to others, more skilled in generic nomenclature.

SATYRUS PEGALA.—Mr. Holland gives in his butterfly book on plate xxvi a picture of the female with two eye-spots. Finding that there are few flies with two eye-spots I caught a pair in coition and discovered that there are two kinds of females. One with two eye-spots and the other with one spot in the primaries. The latter one is more abundant. This insect is hard to catch, flying in zig-zag and alighting on trees.—CHAS. FAUST, Magnolia Springs, Baldwin Co., Ala.

Notes on the Life-Histories of Certain Wood-Boring Lepidoptera.

By Francis X. Williams, San Francisco, Cal.

(Plate IV.)

Vespamina sequoiæ Hy. Edwards.

In the Monterey pine forests at Carmel, Monterey Co., Cal., this insect was quite plentiful. Usually the resinous masses beneath which the larvæ dwelt were not above the reach of the hand, and I think it quite probable that the insect takes advantage, as often as it may, of a wound in a pine trunk as a nidus in which to oviposit. Those nodules in or under which there are larvæ are of soft consistency and exude resin; those containing pupæ in their silk-lined tubes, or larvæ about to pupate, may be known by their duller color, more generally even surface, and by the fact that the pitch has ceased to flow and the mass is somewhat hardened. As far as my observations go there is but one insect to a nodule, except sometimes in those cases where an old mass of resin of considerable size has been utilized by two. The adult has quite an extended season; pupæ have been sent me at the end of March, 1908; the preceding year in May I reared a male; during June, 1908, I secured several more specimens; and finally two emerged during September of the same year. Like most other borers, the pupæ, unless almost on the point of disclosing moths, will dry up and die if taken out of their chambers.

Sesia mellinipennis Boisduval.

This is a common Californian "Clear-wing," somewhat variable in markings and enjoying a wide range. The writer, while examining a large decumbent trunk of *Ceanothus thrysiflorus* in a canon a few miles south of Carmel, in June, 1908, found the larvæ and a pupa of this insect, the former boring into the solid wood, the latter under the bark in a pupal chamber of particles of wood fastened together with silk. A section of the infested trunk was sawed off and taken to San Francisco, where in August I was rewarded with three fine moths.

Sesia polygoni Hy. Edwards.

This pretty little red sesian is the only one I have found in San Francisco, and until this season has been considered quite rare here. Formerly I used to take two or three adults per season, but this year the discovery of its larval food-plant yielded me a fair series of imagines. On the 7th of July, while hunting Lepidoptera a few miles south of San Francisco, in the Lake Merced region, I noticed a male *S. polygoni* rise heavily from a *Polygonum paronychia,* a prostrate perennial which forms a carpet over the sandy soil in which it grows. I netted this freshly hatched moth, and upon examining the plant found its crown badly infested with a borer, which proved to be *polygoni.* However, the season for adults was rather past and but one or two larvæ and pupæ were procured here. On examining other *Polygonum* plants I found them very generally infested. A majority of the moths had already emerged, but I found quite a number of pupæ and some larvæ. An infested plant was readily detected by the quantity of pale reddish brown frass about the base, and frequently by its sickly appearance. Large plants sometimes contain two larvæ apiece.

The larva (Fig. 3) is quite slender; head brown; body dull dirty white, dorsal line dark, cervical shield weak, pale brown. Length of mature larva about 17 mm. The arrangement of the hairs and plates is shown in Figs. 4 and 5.

The pupa is rather slender, pale brownish, with the more heavily chitinized portions darker, and as in other members of this family is armed with abdominal rows of spines and a pointed process over the head. Length 12 mm., width 3 mm.

As the smaller stems of *Polygonum* frequently contain smaller mines (see Fig. 1, upper portion), it is probable that the larvæ first work their way downwards, often boring far down into the main root. Deserted galleries are found to be filled up with frass; this is probably done in a great measure when the larva prepares its pupal chamber. This is usually of considerable length, the longest measured is illustrated in Fig. 1 and is 55 mm. long. Others measured were 54, 53, 50, 45, 45, 41 and 35 mm. respectively. Small stems containing

borings were mere shells. The pupal chamber, which is slightly wider than the pupa, is frequently curved, and extends underground for its greater length; its lower end is usually the filled-up continuation of a gallery. The chamber is well lined with silk, and its upper end connecting with the exterior is closed with bits of frass, etc., secured together with silk. All the enlargements of this tube are carefully filled in.

I obtained from larvæ and pupæ about 20 imagines, which emerged from July 8th to July 20th. Like *Vespamina sequoiae* and other sesians, *polygoni* has a long season, and larvæ of various sizes (though the majority of them well grown) were found in July and August.

This pretty little species is beautifully illustrated in Beutenmuller's "Monograph of the Sesiidæ of North America North of Mexico." The insect was described by Hy. Edwards ("Papilio," Vol. I, p. 202, 1881) from 1 male taken on *Polygonum maritimum,* San Miguel, Cal.

Pterophorus baccharides Grinnell.

This large pale-colored plume-moth has been recently described by Mr. Fordyce Grinnell, Jr. (*Canadian Entomologist,* Vol. XL, pp. 317-318, 1908) from specimens reared by me from the stems of *Baccharis pilularis* in San Francisco.

The insect is quite common here as well as at Stanford University and at Carmel in Monterey Co., and probably has a wide coast distribution. The wood-boring habit of the larva is interesting, but not unique among the Pterophoridæ.

Description of a nearly mature larva (fig. 12).—Head pale brown, darker about the mouth and along the sides, clypeus not reaching half way to vertex. Body of uniform thickness, somewhat depressed, shining white, with slight creamy yellow tinge ventrad; cervical shield strong, pale brownish, with two transverse patches of small dark brownish tubercles, interspersed rather sparsely with hairs, the first patch the narrower. On the second and penultimate segments is a less developed patch. On each side of the dorsal line an irregular, rather broad and broken purple line; subdorsad a heavier, wider purple band; and below the brownish spiracles an indistinct geminate line of the same color, with an extended blotch just cephalad of each spiracle. Indications of another line below lateral fold. Body with sparse brownish hairs, ex-

cept on last segment where the heavily chitinized, dark brown anal plate is widely bordered with numerous dark hairs arising from small tubercles. This plate (fig.) which occupies obliquely half the segment contains a raised disc somewhat below its middle, bearing a pair of slightly upcurved chitinized processes. On this plate between and below the prongs are rough granulations. Feet dull white, with pale brown blotches; prolegs dull white, crochets semicircular. Length of mature larva 16 mm., width (at seg. 6) 2.75 mm.

Described from fresh specimens, measurements from alcoholic material.

Pupa.—Slender, cylindrical, slightly narrowest above middle, color pale yellowish brown, darker at base of abdominal segments, and very dark brown at the obliquely truncate cephalic end, which is heavily armed with numerous little spines. Of these, there is a strong ridge of large ones at the base of each antenna above, and a smaller group on each shoulder. Brown hairs especially along dorsal edge of this area and on thorax and abdomen. On lower dorsal border of segments 4, 5 and 6 of abdomen is a row of spines pointing obliquely cephalad, and on the remaining segments is a row pointing obliquely caudad. Somewhat below the lateral line of each of the spiny segments are other spines arranged in a row, on segments 4, 5, and 6 few, on the remaining segments becoming more numerous. Fused leg and wing tips free from body. Length 15-18 mm., width at thorax 2.80 mm.

Described from alcoholic specimens.

The larva bores a smooth cylindrical passage in the stem of *Baccharis pilularis,* and the oblique opening can be readily detected by the quantity of pale-colored frass on the ground below. The galleries may be in the smaller stems or in the main trunk and at least partly above ground. On tall shrubs the caterpillar may be found working high up in the stems. Several parallel passages often occur in one stem, and are usually quite straight and almost invariably open on the under side of the branch.

The pupa, which is very active, lies some distance from the bottom of the gallery, but may move considerably therein. The pupal chamber is not silk-lined. A short search in winter revealed no pupæ of this insect, but half-grown and nearly mature larvæ were plentiful. The larval period, while not determined, must be of at least a year's duration. Adults were

common in June and in September. The cocoons of a hymenopterous parasite were found in two galleries, but no adults have as yet been secured.

EXPLANATION OF PLATE V.

Fig. 1.—Pupa of *Sesia polygoni.*
Fig. 2.—Pupal chamber of *S. polygoni* in stem of *Polygonum paronychia.*
Fig. 3.—Sixth segment of larva of *S. polygoni.*
Fig. 4.—Extruded pupal shell of *S. polygoni.*
Fig. 5.—First two segments of larva of *S. polygoni.*
Fig. 6.—Larva of *S. polygoni.*
Fig. 7.—Pupa of *Pterophorus baccharides.*
Fig. 8.—Caudal extremity of larva of *P. baccharides* showing anal plate.
Fig. 9.—Seventh segment of larva of *P. baccharides.*
Fig. 10.—Nearly mature larva of *P. baccharides.*
Fig. 11.—First two segments of larva of *P. baccharides.*
Fig. 12.—Pupal chamber of *P. baccharides.*

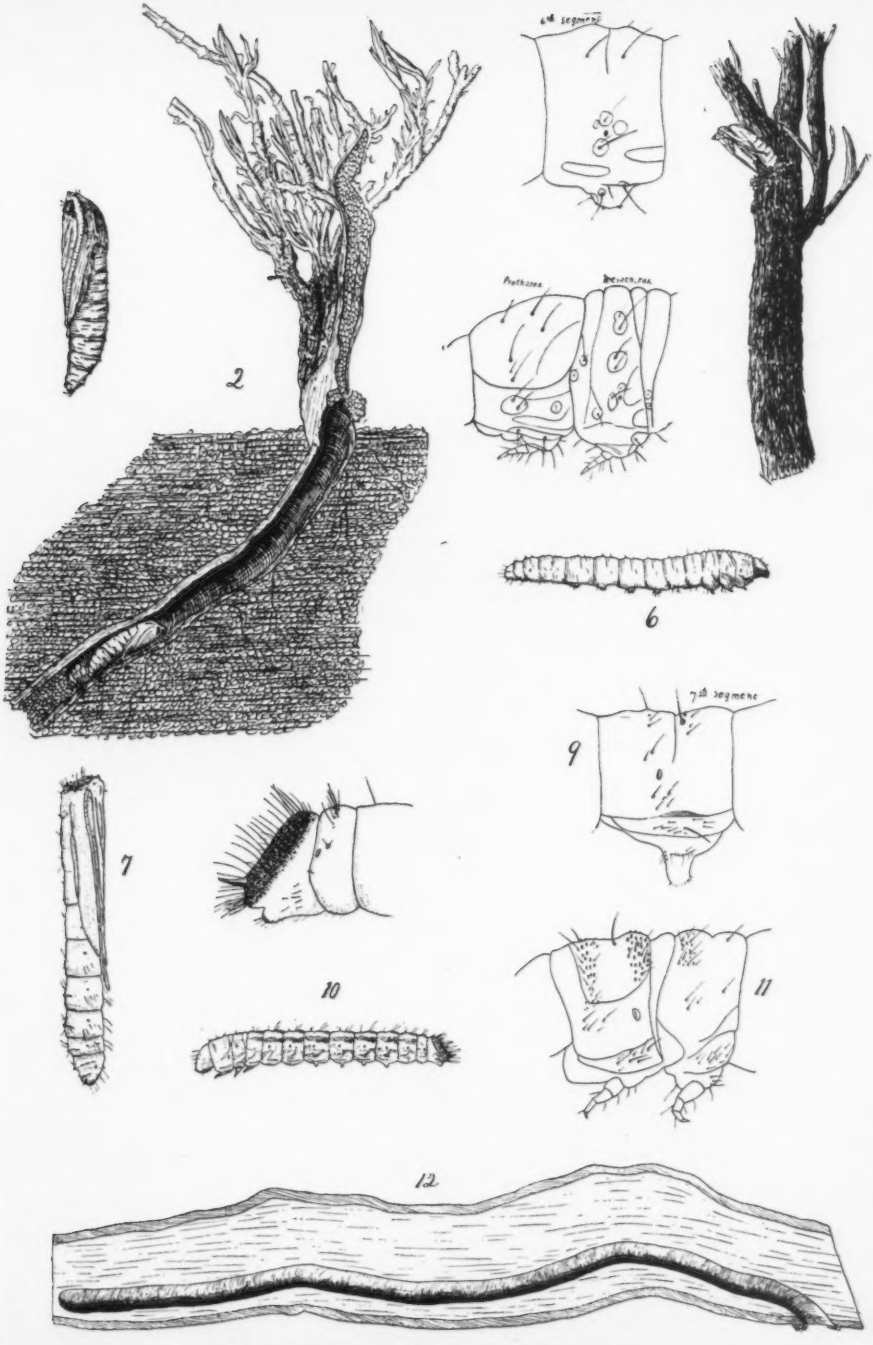
All figures except 2, 4 and 12 more or less enlarged; figs. 2, 4 and 12 about natural size.

The Butterflies and some of the Moths of the Mt. Shasta Region.*

By Francis X. Williams, San Francisco, Cal.

The writer spent a portion of the summers of 1901, 1902, 1903 and 1907 near the little town of Castella, on the banks of the Upper Sacramento River, in the northwest portion of Shasta County. During the summer of 1901, few insects were captured and none preserved, as the writer did not then possess the "mania" for catching butterflies which he now has. In 1902, however, some real collecting was done, while in June and July of 1903, which was by far the best of the four seasons, a large number of species were taken. Although nearly two months of the summer of 1907 were spent in assiduously collecting Lepidoptera, fewer specimens were taken than in my shorter stay in 1903. This was probably due to the fact

*The Sphingidae, Saturniidae, Arctiidae, Sesiidae and Hepialidae are given in full, other families of Heterocera represented in region under consideration are incompletely listed or omitted.



WILLIAMS ON WOOD-BORING LEPIDOPTERA.

that in 1907 the summer was initiated by severe rain showers while the whole summer was exceptionally cool.

Headquarters were established near Castella, only eight or nine miles south of Upper Soda Springs in Siskiyou County, where Henry Edwards and James Behrens collected Lepidoptera for many seasons.

From Castella several expeditions of from 13 to 25 miles into the mountains were made, and it was a pleasure indeed to leave the valley when butterflies were becoming ragged and warm to capture fresh and perfect specimens in the mountain meadows, which, barring Culicidae, are a source of delight to the entomologist.

In the vicinity of Castella the steep wooded mountains draw close together and the valley becomes canon-like, so that in early summer insects alpine in habits are often found in the valley, which is here about 1,900 feet above the sea level.

On the east side of the Sacramento is a range of mountains from 4000 to 6000 ft. high, beyond which is the McCloud River, and on the west are the higher Trinity Mountains rising over 7000 ft. in several places, and terminating northward in Mt. Eddy, 9,151 ft. high. This range is the dividing line of Shasta and Trinity Counties, and is studded with small but beautiful glacial lakes, always in a protected hollow on the north slope of some rocky peak, and fed by its melting snows. Such lakes visited were Echo Lake, the principal source of Castle Creek, and situated at the base of the sharply conical Tamarack peak 7000 ft. high; Gumboot, Bluff, Picayune and Castle Lakes, the first three in Trinity and the last in Siskiyou County; and finally, three unnamed lakes in the former county, and giving rise to the east fork of the Trinity River flowing westward to join the Klamath near the ocean. A trip was made to Sisson to the north, and two to the swift blue McCloud River, from different points. Needless to say, all these localities furnished a number of interesting Lepidoptera.

C. Hart Merriam has made a careful study of the life zones represented on Mt. Shasta (see N. A. Fauna No. 16, U. S.

Dept. Agric. Div. Biol. Survey, 1899), and what he says of the zones there can as well be applied to the region about Castella, only 21 miles south of the mountain.

The Transition zone embraces the whole country about Mt. Shasta, except Shasta Valley to the northward (which is diluted Upper Sonoran), and fills the McCloud and Pitt River Valley to the south and reaching into the mountains to an altitude of 5000 or 6000 ft. It consists chiefly of coniferous forests, which in the lower and more arid regions, are composed of *Pinus ponderosa* interspersed with other conifers, as *Pseudotsuga mucronata* and *Libocedrus decurrens,* which, however, grow in moister places than the yellow pine and extend higher into the mountains. The black oak (*Quercus californica*) is found with *P. ponderosa, Taxus brevifolia* occurs along the river edges, while the sugar pine (*Pinus lambertiana*), *Abies concolor lowiana* are abundant about the middle or upper portions of the zone. Only one grove of *B. attenuata* was seen. The white fir (*Chamaecyparis lawsoniana*) occurs in moist groves as far up as the Canadian zone.

This is a less extensive zone than the first and characterized by forests of smaller conifers, etc. Restricted to this zone, which has a vertical height of about 2500 ft., is the Tamarack or lodge-pole pine (*Pinus murrayana*), the White Mountain pine (*Pinus monticola*), and the Shasta fir (*Abies shastensis*). Among the shrubs *Quercus vaccinifolia* and *Arctostaphylos uvaursi,* both low spreading plants, were noted as belonging here. A *Rhododendron* with rose-tinged flowers was common in this zone growing along the lake margins and small creeks. The marshy mountain meadows form conspicuous green patches, often of large extent at one or both ends of the lakes, while dryer and more exposed portions of this zone have a more or less open growth of chaparral, with here and there a clearing, often carpeted with polygonaceous and other flowers.

The Hudsonian zone was noted in the Trinity Mountains as small groves of alpine hemlock (*Tsuga mertensiana*) growing on the cool shaded sides of the highest ridges, at an altitude

of about 7000 ft. In the middle of July, 1907, many of these stunted and bent little conifers were still standing in two or three feet of snow, while on the south exposure of the same ridges one finds himself in barren or chaparral portions of the Canadian.

Although plants characterize the zones better perhaps than do insects, yet a number of butterflies and some moths seemed quite restricted as regards their range. The Transition zone which contained the largest number of species was found to be characterized in its lower portion by *Melitaea chalcedon* and *leanira. Carterocephalus palaemon, Pamphila agricola, pratincola, vestris* and *comma* seemed strict residents of the Lower Transition, with *Anosia plexippus, Argynnis zerene* and *monticola, Heterochroa bredowi, Thecla nelsoni, Chrysophanus gorgon* and *Papilio rutulus* seldom out of it. *Papilio daunus* by the way, always kept to the valley. Among the moths of the Lower Transition were *Pholus achemon, Phlegathontius quinquemaculata (celeus), Sphinx oreodaphne* and *sequoiae, Telea polyphemus, Saturnia mendocino, Sesia mellinipennis, rutilans* and *behrensii.*

The "sooty gossamer-wing" (*Satyrium fuliginosa*) was confined to the chaparral growth of the Upper Transition.

Melitaea hoffmani, Chrysophanus zeroe and *mariposa,* a *Lycaena* allied to *behrii,* and *Lycaena podarce* were not observed outside of the Canadian zone. *L podarce,* always found in the meadows, is a very good criterion of this life area.

The very limited Hudsonian had no butterflies peculiar to it, though *Chionobas nevadensis* was more common there than elsewhere.

A large number of species of butterflies and moths can be found from the Lower Transition into the Canadian, but these are usually more common in some particular portion of one zone.

A difficulty which the entomologist is apt to encounter in tracing out the zonal ranges of certain insects, if his hunting grounds are in a mountainous country and he arrive there in

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A difficulty which the entomologist is apt to encounter in tracing out the zonal ranges of certain insects, if his hunting grounds are in a mountainous country and he arrive there in

midsummer or late summer, is that the insects which he sees at high altitudes and appearing peculiar to that level, may in late spring or early summer frequent the valley region as well.

This is true of *Melitaea palla* which practically disapears in the valley before July, but only commences to come out in the mountains in the Canadian zone when that month is well initiated. *L saepiolus* usually a resident of the Canadian, occurs sparingly in the valley at an early date. *L. fulla* and *sagittigera,* earlier in the valley were usually much later in the mountains. *Parnassius clodius* was seen on several occasions at 1900 ft. in June, but were just emerging at an altitude of 6000 ft. July 10. The June specimens must have emerged in the valley region, since there were none in the mountains at that date. Among the moths, *Sphinx perelegans* comes out about one month later at Echo Lake, altitude about 6500 ft., than it does in the valley, elevation 1900 ft. *Alypia langtoni* likewise is early in the valley and late in the mountains. The exquisite little *Gyros muirii* was in fine condition at Echo Lake on July 10, 1907. On June 12, 1903 a hardly recognizable specimen of this species was taken in the Castle Creek Canon, at an elevation of 2000 ft.

PAPILIONOIDEA.

1. *Anosia plexippus* Linn.—Quite common in 1907 in the valley where milkweed was abundant. A specimen from Echo Lake is quite a good deal darker in color than valley examples.

2. *Argynnis leto* Behr.—Rare at Castella, but not uncommon at Sisson further north.

3. *Argynnis oweni* Edw.—Not rare in the mountain meadows in July and August, flying also in the uppermost Transition in the more treeless areas. This is strictly a mountain form; the type locality of the species is Mt. Shasta, elevation 7,500 ft. (Owen).

4. *Argynnis zerene* Bdv.—The most common "fritillary" of the region, and confined chiefly to the valley where it flies with the following species.

5. *Argynnis monticola* Behr.—Quite common, the larger var. *purpurascens* Hy. Edw. rarer. *Zerene* and *monticola* were just putting into appearance when my brother and I reached Castella at the end of June in 1907. The males come out earlier than the females, and both sexes are very fond of feeding at the flowers of *Apocynum androsaemifolium* var. *pumilum,* a small plant common by the roadside. The

blossoms of these plants fail before the summer is past, and the Argynnis are then contented with the late-blooming monardellas. Early in August female *monticola* and *serene* could be seen flying about the hills in a faded condition, once in a while alighting among the dead leaves to oviposit. There is considerable doubt as to whether *A. monticola* and *serene* are really two distinct species.

6. *Argynnis coronis* Behr.—But a single female example captured. A few others seen near the McCloud River.

7. *Argynnis rupestris* Behr.—Not a common insect; in the valley.

8. *Argynnis epithore* Bdv.—Quite common in the Canadian zone, especially about the meadows. Occurs sparingly and earlier in the valley.

9. *Melitaea chalcedon* Db. and Hew.—Very abundant in the valley region in June and early July. Numbers of these insects congregated about moist sandy spots along the McCloud River where they could be picked up with forceps. The yellow bands on the under side of the wings of Shasta *chalcedon* average distinctly paler than in specimens taken about San Francisco. A small colony of *Melitaea* larvae found aestivating under a board on August 9th probably belonged to this species.

10. *Melitaea palla* Bdv.—This very variable species was taken both at high and low altitudes. Male specimens from the Shasta Canadian zone are much blacker basally than males from the San Francisco bay region. The females may be "foxy red to blackish with all intergrades." This was noted by Hy. Edwards, Behr and probably by others, and the specimens described by Wright in his "Butterflies of the West Coast" as *eremita* n. sp. is the dark form of females, which occurs both in northern and central California.

11. *Melitaea hoffmani* Behr.—Rather rare and taken in the mountain meadows.

12. *Melitaea leanira* Bdv.—Not plentiful and always in the valley region.

13. *Phyciodes pratensis* Behr.—Fairly abundant; usually in the Transition, but also found in the Canadian Zone.

14. *Phyciodes mylitta* Edw.—Rather common; Echo Lake specimens taken at an altitude of 6,600 ft. are quite dark.

15. *Grapta satyrus* Edw.—The commonest *Grapta* of the region, but not plentiful at that.

16. *Grapta faunus* Edw.—Rare.

17. *Grapta zephyrus* Edw.—Rather rare. A worn specimen taken at Echo Lake, July 12, 1907, may have hibernated. Larva on *Rhododendron.*

18. *Vanessa antiopa* Linn.—Common enough and unrestricted in its range.

19. *Vanessa californica* Bdv.—Fairly swarming in June and July, 1902, but rare in 1907. This species is noted for its erratic movements.

20. *Pyrameis caryae* Hbn.—Noted at Echo Lake, July, 1907.

21. *Pyrameis cardui* Linn.—Noted at Echo Lake, July, 1907.

22. *Junonia coenia* Hbn.—A common insect of the lower levels.

23. *Limenitis lorquini* Bdv.—Quite common, especially in the valley.

24. *Heterochroa bredowii* Hbn.—Rather abundant.

25. *Coenonympha brenda* Edw.—Specimens from Shasta County correspond to *brenda*, as illustrated in Wright's book, but do not agree so well with Edwards' description of the species. Common in August in grassy localities in the valley.

26. *Satyrus ariane* Bdv.—Common in July about wooded hillsides. There is much variation in my series of the species, but they all seem referable to *ariane*.

27. *Satyrus silvestris* Edw.—Commoner perhaps than the preceding species and usually occurring at higher elevations. *Silvestris* has a curious habit of alighting on pine trunks, out of the reach of a net.

28. *Chionobas nevadensis* Feld.—This is the same as Boisduval's *californica*, which he reports as occurring on high mountains at the snow line. I took *nevadensis* in the Upper Canadian and in the Hudsonian Zone about Echo Lake at the end of July in 1902, when it was not uncommon. No trace of it was seen in 1907, however. It is not an easy insect to capture, and it is with difficulty that it can be "scooped off" the boulders on which it sits, all on the alert.

29. *Thecla grunus* Bdv.—Common, especially about *Quercus chrysolepis*. Taken in the Canadian Zone, but more plentiful at lower levels.

30. *Thecla halesus* Cram.—This gorgeous insect was taken only twice; in the valley region in June, 1903. It is essentially a southern species, but is probably well established in Shasta County, where its food plant—mistletoe—occurs on the black oak.

31. *Thecla m-album* Bd. & Lec.—A single worn female, June, 1903. Boisduval in his "Lepidoptères de la Californie" reports it from the extreme southern portion of California.

32. *Thecla melinus* Hbn.—Rather rare; in the valley.

33. *Thecla californica* Edw.—Quite plentiful along the stream margins. A number of pupae shells girdled to the underside of stones in the vicinity of willows probably belonged to this species.

34. *Thecla saepium* Bdv.—A very common insect along the Sacramento River in July, where it frequents the blossoms of a species of *Clematis*.

35. *Thecla nelsoni* Bdv.—Not very plentiful and coming out rather early in summer. In the valley in June.

36. *Thecla iroides* Bdv.—Common and widespread.

37. *Thecla eryphon* Bdv.—But two specimens taken; one rather fresh, female, in the pine woods in early July, 1903, and a faded female captured on alpine hemlock, Echo Lake, July 12, 1907. This insect also occurs in southern California. I have seen a specimen from Monterey and have taken it on Mt. Tamalpais in Marin County.

38. ***Thecla dumetorum*** Bdv.—Not rare, especially in open stony places in the Canadian Zone. Have found the larva on a species of *Eriogonum* in San Francisco. While my female specimens from the latter locality have at most an obscure bronze tinge, those taken at Echo Lake are very bronzy.

39. *Chrysophanus virginiensis* Edw.—A common "copper" along the banks of the McCloud River at the end of July, 1907, and occurring also high up the Castle Creek Canon in July and August of the same year.

40. *Chrysophanus gorgon* Bdv.—Partial to the more open dry spots along Castle Creek, the Sacramento River, where *Eriogonum* abounded. The females vary much in intensity of markings. Commonest in July, 1903.

41. *Chrysophanus mariposa* Reak.—Never abundant and always well in the Canadian Zone, where they are in season at the end of July.

42. *Chrysophanus xeroe* Bdv.—Likewise a mountain species and somewhat rarer than the preceding. Several males and females taken at the end of July.

43. *Chrysophanus helloides* Bdv.—Fairly plentiful in the valley.

44. *Satyrium fuliginosa* Edw.—Peculiar to the Upper Transition, and flying about chaparral. The flight is swift and much like that of a Theclid. Almost all my specimens of *fuliginosa* were caught in July, 1903, about the base of the Gray Rocks on the south side of Castle Creek.

45. *Lycaena heteronea* Bdv.—Rather common and often in company with *C. gorgon*. Its food plant is probably also *Eriogonum*. Sometimes taken in the Upper Transition. The females vary somewhat in color and have the wings sometimes shot with blue. Common in July.

46. *Lycaena fulla* Edw.—Rather common in early summer in the valley, later in the mountains.

47. *Lycaena saepiolus* Bdv.—Likewise found in the valley in June, but its real habitat is the Canadian meadows, where it is abundant enough in the latter part of July. In the Shasta region the females are not in the least blue, being dusky, with a more or less distinct fulvous band on the upper side of the secondaries, often with a trace of the same on the primaries.

48. *Lycaena behrii* Edw.—Only taken at Echo Lake in the Canadian Zone, June 22, 1903, and July 12, 1907. I have called this insect *behrii* not being able to place it elsewhere. It differs from the typical *behrii* as described by Edwards, and which is common about San Francisco bay in March and April. This latter insect has the underside of both wings dark brownish gray and the female on the upperside is almost entirely fuscous. In the male the color on the upperside is "glossy lilac-blue," with the hind margins of both wings fuscous. In the specimens from Echo Lake, the male lacks the lilac tinge and the margins are

more narrowly dusky, while the underside in both sexes is of a pale gray color, the pupilled spots are smaller than in typical *behrii*, with those of the secondaries usually proportionally smaller. The female is shot with blue on the upperside to the outer three-fourths or more. It appears more nearly related to the southern *polyphemus*. A specimen from Mt. Diablo much resembles those from Shasta.

49. *Lycaena sagittigera* Feld.—A rather rare insect, most frequently seen about Echo Lake in July, 1907.

50. *Lycaena podarce* Feld.—Confined to the Canadian meadows, where it is quite plentiful and can be readily bottled from the flowers during cloudy weather. It is on the wing somewhat earlier than *saepiolus*.

51. *Lycaena enoptes* Bdv.—Some of the males of this species have some orange at the anal angle of the secondaries, but most lack it. The females are all fuscous, with a more or less distinct orange band on the secondaries. There is much variation in size in *enoptes*, and they do not resemble the *enoptes* figured in Wright's book. I have found the species both in the Canadian and Lower Transition Zones in the Shasta region.

52. *Lycaena anna* Edw.—Rather common and always in moist weedy localities, perhaps commonest in elevated regions.

53. *Lycaena acmon* Db. & Hew.—Common and occurring at all elevations visited. This species varies much in size and intensity of coloration. My smallest male, from the McCloud River, expands 17.5 mm., while my largest female, from the Canadian Zone of the Trinity Mountains, has an alar expanse of 31 mm. My females from the Shasta region are all of the brownish variety, with very little suffusion of blue. Two males from Echo Lake have the marginal fuscous band wider than ordinary. I have reared adults from larvae feeding on *Eriogonum* and *Hosakia*.

54. *Lycaena piasus* Bdv.—A very common insect and the "blue" most frequently seen congregated about moist spots. At all elevations.

55. *Lycaena comyntas* Godt.—Common in the valley in July.

56. *Lycaena amyntula* Bdv.—Likewise in the valley, but rarer than the preceding species.

57. *Neophasia menapia* Feld.—Common in the coniferous forests and not often descending into the valley.

58. *Pieris sisymbri* Bdv.—Only taken about Echo Lake in July. Its habitat appears to be in the mountains.

59. *Pieris occidentalis* Reak.—In the valley; rare.

60. *Anthocharis lanceolata* Bdv.—An early butterfly, and only seen in the valley, where its food-plant, *Sisymbrium officinale*, grew. Several faded examples of this butterfly were taken early in June, 1903; and in early July, 1907, some belated larvae were found. Two perfect examples secured from overwintering pupae emerged in May and June, 1908.

61. *Anthocharis creusa* Db. & Hew.—Found with *P. sisymbri*, but rarer.

62. *Anthocharis sara* Bdv.—1 male taken in 1903.

63. *Colias eurytheme* Bdv.—Common and at all elevations. The albino females plentiful.

64. *Colias chrysomelas* Hy. Edw.—Rather rare, especially so in 1907. In the valley and canons in July.

65. *Parnassius clodius*, Men.—A common insect at proper elevations. In the mountains in July.

66. *Parnassius smintheus* var. *hermodur* Hy. Edw.—Perhaps rarer than the preceding, with which it flies in the Canadian Zone.

67. *Papilio philenor* Linn.—None taken, but several old specimens observed about Castella. Not rare in lower Shasta County on the flowers of buckeye (*Aesculus californica*).

68. *Papilio zolicaon* Bdv.—Rather common, except in 1907. Both red and yellow banded larvae of this species were noticed. Found most commonly on mountain summits. Shasta specimens appear finer than those from the San Francisco bay region.

69. *Papilio indra* Reak.—A rare and rather early insect, taken on the Sacramento and McCloud Rivers. There is some variation in the length of the tails in this *Papilio*.

70. *Papilio eurymedon* Bdv.—A common insect in the valley and on the mountains. The larva of this species was found feeding on *Rhamnus californica* and two species of *Ceanothus*. The larva of this and of the following two species, when about to pupate, change from green to chocolate-brown. *Eurymedon* pupae may be brown or greenish in color. A female reared from a larva emerged April 29, 1908.

71. *Papilio rutulus* Bdv.—Commoner than the preceding species and usually restricted to the valley region. On a moist sandy spot on the banks of the McCloud River, *Papilio rutulus* and *eurymedon* congregated in numbers, in company with numerous *M. chalcedon*, *L. piasus* and others. A single stroke of the net bagged a number of the swallowtails. The imperfect specimens were killed and arranged on the sand and boulders with the effect of attracting other Papilios, flying downstream. These, pausing to view their slaughtered brethren, were readily captured, and thus a fine series of perfect specimens, all males, were taken.

72. *Papilio daunus* Bdv.—This fine insect was found to be rather solitary in its habits and difficult to capture, especially in first-class condition. It is partially double-brooded, the spring adults appearing in May and June, and the summer ones in late July and early August. At the end of June both young and mature larvae of *daunus* were observed feeding on *Cerasus demissa*. Several imagines were reared from these larvae and emerged in early August, while other pupae hibernated. The larva is much larger than that of *eurymedon*, being

lighter green, often with a yellowish tinge, and attaining a length of about 2 inches.

73. *Carterocephalus palaemon* Pall.—Rare; in the valley in June.

74. *Pamphila juba* var. *viridis* Edw.—One female at Dunsmuir, August 6, 1907; one female, Echo Lake, July 12, 1907.

75. *Pamphila comma* Linn.—A few males on the McCloud River in July, 1907.

76. *Pamphila agricola* Bdv.*—Rather common in the valley and often associated with the following species.

77. *Pamphila pratincola* Bdv.*—Common.

78. *Pamphila siris* Edw.*—Not uncommon in the valley and often associated with *vestris*. In June and July in the Transition Zone. One male, Trinity County, 6,000 ft., August 15, 1907.

79. *Pamphila vestris* Bdv.*—Not rare in marshy spots, on mountain sides at low altitude, and in similar situations in the valley. Fresh in June.

80. *Amblyscirtes vialis* Edw.—Rare, only two specimens taken. It is not, so far as I am aware, supposed to be Californian.

81. *Pyrgus tessellata* Scudd.—A common insect.

82. *Pyrgus caespitalis* Bdv.—Rarer; usually more abundant in the mountains.

83. *Thanaos persius* Scudd.*—Quite common at all altitudes. It is fond of frequenting moist situations.

84. *Thanaos propertius* Lint.—Common, with about the same distribution as the preceding species.

85. *Eudamus pylades* Scudd.—Rather rare.

86. *Eudamus aemilea* Skinner.—Three males and one female, Echo Lake, July 12, 1907. It is a rare and wily species here.

87. *Eudamus tityrus* Fabr.—Not uncommon, especially in the valley. One fine male obtained from an overwintering pupa emerged May 21, 1908.

HETEROCERA.

1. *Hemaris thetis* Bdv.—Rare in Shasta County, where a few specimens were taken feeding at *Asclepias* blossoms.

2. *Lepisesia clarkiae* Bdv.—Quite common in the valley in early June, 1903, feeding at the flowers of *Brodiaea, Rhododendron* and *Asclepias*. The insect (which flies shortly before noon until late afternoon) is evidently in full season in May, but flies in March in Marin County. Specimens from the latter place are much more difficult to capture than the Shasta specimens, which average smaller in size and are of a greener color. The eggs are laid upon the leaves of *Clarkia, Godetia* and *Epilobium* sp. The larva, which has no anal horn, is pale greenish in the first three instars and brownish in the last, being darkest on

* Identified by Dr. Henry Skinner.

the dorsum to the subdorsal line; the stigmata are in subtriangular blackish areas. The pupa has no protruding tongue case.

3. *Deilephila chamoenerii* Harris. I saw a fine specimen of this sphinx caught by Mr. J. E. Cottle near Castella in 1903.

4. *Deilephila lineata* Fabr.—A very common hawk-moth here, both in the valley and in the mountains.

5. *Pholus achemon* Dru.—Quite abundant in July. Taken at the flowers of *Oenothera* and *Rhododendron*. Larva on wild grape.

6. *Phlegethontius quinquemaculata* Haw.—Moderately common and feeding at the flowers of *Oenothera*.

7. *Sphinx drupiferarum* S. & A.—Rare; only a few worn specimens taken. In June in the valley.

8. *Sphinx perelegans* Hy. Edw.—Fairly abundant, coming out very much later in the season in the mountains than in the valley. Taken at *Rhododendron* and *Oenothera* blossoms. A handsome *Sphinx* larva found feeding on a species of *Arctostaphylos* most probably belonged to this species.

9. *Sphinx oreodaphne* Hy. Edw.—Considerably smaller in size than the eastern *chersis*. Larva on Oregon ash. Confined to the valley, where it is not uncommon.

10. *Sphinx sequoiae* Bdv.—An abundant insect in the valley region about Castella, and, owing to its short haustellum, feeding almost exclusively at the flowers of *Asclepias*. Larva on *Cerasus demissa*. Pupa without protruding tongue case.

11. *Smerinthus opthalmicus* Bdv.—Not rare, and occurring up to the Canadian Zone. Larva on *Salix*.

12. *Attacus ceanothi* Behr.—Plentiful. Adults darker than coast specimens from central California. The larva commonly feeds upon *Rhamnus californica* and *Ceanothus sp.*, but I have received a specimen from Carmel, Monterey County, which was feeding on *Pinus radiata*, while in Shasta County I have found a single larva on *Pseudotsuga mucronata* (Douglass spruce), etc., a number on *Salix* and *Arctastaphylos* sp.

13. *Telea polyphemus* Cram.—Fairly common in the valley.

14. *Calosaturnia mendocino* Behrens.—The larva of this species was not uncommon in July, 1903, feeding on several species of *Arctostaphylos*. Several fine adults were reared. I could find but two larvae of this fine moth in 1907.

15. *Pseudohazis shastaensis* Behr.—This is a common insect of the chaparral region, and its rapid irregular flight makes it a difficult moth to capture. Flying as it does over the brush, its wings are usually scratched and torn. The best way to procure specimens of this moth is to get up early and hunt up an unmated female, cage her and await the sunshine. The females are not easy to find and are detected ordinarily by the males which hover about her. When caged and placed in a chaparral area where the species abounds, males are not slow in

approaching the cage, always from the lea side, however, and usually flutter madly about the cage. A particularly fine and desirable variation, however, appears to be aware of his value to the entomologist and gives the place a wide berth. Over fifty perfect and a large number of imperfect males were captured by means of imprisoned females. Among them were several very black specimens and a few beautiful *denudata*. The males cease flying at about 3.30 P. M., when they alight in the brush, and a trip up the mountain slope in the late afternoon often repays one for his efforts. The females are sluggish, easily captured, but more rarely seen. In Shasta the insects hibernate as pupae, but in the vicinity of San Francisco as ova.

16. *Ctenucha multifaria* Wlk.—Fairly common.

17. *Leptarctia california* Wlk.—Common.

18. *Diacrisia vagans* Bdv.—Common.

19. *Isia isabella* S. & A.—Rare; only two specimens taken.

20. *Platyprepia virginalis* Bdv.—A common valley species. The var. *guttata* Bdv. also plentiful.

21. *Apantesis incorrupta* Hy. Edw.—Not rare.

22. *Euchaetias oregonensis* Stretch.—Quite common in the valley. The very active larva of this species feeds on *Apocynum androsaemifolium* var. *punulum*, a small plant growing along roadsides, etc. The mature larva (July 17, 1907) is 1.05 inch long, head light brown, body pale yellow, clothed with paler, clay-yellow hairs, longest at the caudal extremity of the larva. It spins a weak cocoon composed of a little silk and its hairs. One adult reared from a 1907 larva hatched June 3, 1908.

23. *Halisidota maculata* var. *agassizii* Pack.—Not rare.

24. *Halisidota argentata* Pack.—Common. The race *sobrina* of the coast region of California is quite a pest of the Monterey pine (*P. radiata*), in Monterey County.

25. *Gnophaela vermiculata* G. & R.—Not rare in the valley.

26. *Alypia langtonii* Cooper.—Common at Echo Lake in July. Larva on *Godetia* sp.

27. *Melaporphyria oregona* Hy. Edw.—A few specimens of this alert insect taken at Echo Lake, July, 1907.

28. *Gyros muirii* Hy. Edw.—Rather rare; in the same locality as the preceding.

29. *Drasteria erechtea* Cram.—A common insect in grassy localities at low elevations.

30. *Drasteria caerulea* Grt.—Common.

31. *Euclidia cuspidea* Hbn.—Common.

32. *Syneda adumbrata* Behr.—The commonest *Syneda* of the region.

33. *Syneda edwardsii* Behr.—Not rare.

34. *Syneda* sp.—A rather large species taken at Echo Lake, July 1907.

35. *Litocala sexsignata* Harvey.—Echo Lake, June, 1903.

36. *Catocala aholibah* Streck.—Not rare in the wooded canons.

37. *Catocala stretchii* Behr.—One specimen taken in August, 1907, seems referable to this species.

38. *Memythrus robiniae* Hy. Edw.—One specimen.

39. *Vespamina sequoiae* Hy. Edw.—This handsome species was found infesting *Pinus ponderosa* and *attenuata*.

40. *Sanninoidea opalascens* Hy. Edw.—One female.

41. *Albuna pyramidalis* Wlk.—One male.

42. *Sesia mellinipennis* Bdv.—In August, flying about black oak.

43. *Sesia rutilans* Hy. Edw.—Common, at flowers and about blackberry vines.

44. *Sesia novaroensis* Hy. Edw.—One female flying at the base of a young spruce tree.

45. *Sesia behrensii* Hy. Edw.—Fairly common in dry stony areas along streams, where it was taken on polygonaceous flowers.

46. *Hepialus behrensii* Stretch (?).—One pair taken in the mountains in July. They seem closer to *behrensii* than to anything else.

48. *Hepialus lenzi* Behr.—Nine specimens of this little "ghost-moth" taken at Echo Lake, July, 1907, besides several taken in the valley at an earlier date in 1903.

Two New North American Phloeothripidae.

CORRECTIONS.—In my recent article published in ENT. NEWS, Vol. XX, No. 1, pp. 28–32, under the above title, the following printer's errors have been noticed :

Page 29, line 19 : "5, 1-1x1; 6, 1-1x1" should read "5, 1-1+1; 6, 1-1+1."
" " 2 of measurements : "1.47 mm." should read ".147 mm."
" " 5 of foot-note : "5, 1-1x1" should read "5, 1-1+1."
Page 30, line 1 of key : "Head one-quarter as long as wide" should read "Head 1.4 times as long as wide."
Page 31, line 5 : "backish" should read "blackish."
" " 6 : "5, 11+1; 6, 11+1" should read "5, 1-1+1; 6, 1-1+1."
" " 1 of measurements: before "length .27 mm." insert "head."

It was the intention of the writer that the figures be inserted in the text, and hence they were left unnumbered. They should be numbered as follows : upper left hand corner, 4 ; upper middle 1 ; lower middle, 3; remaining figure, 2.—J. DOUGLAS HOOD.

MR. HENRY ENGEL has published A Preliminary List of the Lepidoptera of Western Pennsylvania, Collected in the Vicinity of Pittsburgh (reprinted from the Annals of the Carnegie Museum, Vol. V, No. 1, 1908). This is an important communication and will stimulate interest among the collectors of the State. There are 1439 species, and 68 varieties making a total of 1507. In conjunction with Mr. Laurent's list and the list of diurnals published by Skinner and Aaron, from the Eastern part of Pennsylvania, we have a good foundation for future work.

A New Catocala from Arizona.

By C. R. BIEDERMAN.

C. werneri.

♀.—Head gray; thorax dull gray, central portion longitudinally brownish. Collar anteriorly marked by an angulate white line, edged with black on either side. Patagium gray edged with black. Abdomen rather short, dull yellow, brownish toward apex which is abruptly pointed. Superiors gray, flesh tint to brownish slate color. Transverse anterior line black, shaded brown on basal side, upper part distinct, lower covered by a large saddle-shaped patch of blackish brown, which takes up one-half the wing area, commencing near the hind angle along the inner margin to within 3 mm. of base, and extending upwards until it nearly covers the subreniform, basal dash black, light gray shade upper side, basal line black, joining basal dash imperfectly. Transverse posterior line black, shaded with brown anteriorly, extends about 4 mm. when covered by blackish patch. Tooth near cell, short, two equal points, obscured by dark patch. Reniform dark brown, disk light bluish gray, irregular, three dark spots give the appearance of a human face; secondaries medium, vermilion red; median band black, irregular obtuse angulate, fusing with brown basal shade at inner margin, marginal band black, slightly irregular; five distinct spurs at anal angle, narrow, turns upward and joins median band; fringes fade to light straw color at extreme edge. Expanse 51 mm.

Distinguishing features: first the dark patch resembling a saddle the horn of which is formed by the upper part of the transverse anterior line, the end of the seat is elongated upward to the apex; second, the human face-like reniform.

Habitat.—Huachuca Mountains, altitude 8,000 feet. June 15, 1908.

The *Ottawa Naturalist* has published a special Memorial Number* as a tribute to Dr. James Fletcher, under a committee specially appointed by the Council of the Ottawa Field Naturalists' Club, consisting of Mr. Arthur Gibson (acting editor), Mr. W. H. Harrington and Mr. F. T. Shutt. These loving tributes to our dear friend tell to others what a truly great and able man he was. The appended list of his writings show an unusual industry, the more remarkable when we think of his many other activities.

ABOUT the middle of May the Hawaiian Board of Agriculture and Foresty hope to be in a position to engage an assistant entomologist. They want an economic entomologist inclined to take up Coleoptera or Parasitic Hymenoptera as a specialty and one good at laboratory and field work. Their equipment and library are good, salary $1500.00-$1800.00 per annum, depending upon the man. The climate of Hawaii is unexcelled and opportunities good. Correspondence might be opened now. State age, schools, experience; also give references.

Address JACOB KOTINSKY, Superintendent of Entomology, Board of Agriculture and Forestry, Honolulu, Hawaii.

*Vol. XXII, No. 10, Jan., 1909.

Some Corrections in Somatochlora (Odonata—Dragonflies).

By E. B. WILLIAMSON.

In the ENTOMOLOGICAL NEWS, April, 1906, pp. 136-138, Plates V. and VI., I published some notes and figures of species of *Somatochlora*. Since that time M. Martin's Cordulines, Coll. Zool. du Baron Edm. de Selys Longchamps, has been published; and this and correspondence with Dr. Calvert and the examination of other material show some serious errors in my earlier paper. M. Martin's figures of *S. hudsonica* are of a species entirely unknown to me, and all that is said in my paper under this name refers to *septentrionalis*. In fact, I so named Dr. Atkinson's Newfoundland specimens, and they still bear this label, the change in my MS. being made when I discovered in the Harvey collection a male specimen of a different species labelled *septentrionalis*. It now appears that the Harvey specimen should be referred to *franklini*. This is the specimen listed under No. 72, p. 9, in Professor Harvey's Catalogue and Bibliography of the Odonata (Dragonflies) of Maine, University of Maine, Studies No. 4, published after Professor Harvey's death. Professor Harvey's first reference to the species is in the ENT. NEWS., November, 1901, p. 275. In the Harvey material in my collection is a teneral female of the same species, taken at Orono, Maine, June 2, 1899, Bartle Harvey. This specimen has the vulvar lamina and wings as described by de Selys and Hagen for *franklini*. Hence in Professor Harvey's papers and in my paper all notes and figures under *septentrionalis* refer to *franklini*. The necessity for these corrections have been known to Dr. Calvert and myself for some time, and my attention was first called to them in a letter from Dr. Calvert. M. Martin, in his paper mentioned above, on p. 25, under *S. franklini*, quoted de Selys' description, in Syn. des Cordulines, of the male appendages of *S. septentrionalis*. This description, so quoted, if my present determinations are correct, is gravely misleading. In fact neither de Selys or Hagen ever described the male of *franklini*, and there is no evidence that either knew it. Hagen, in his Syn. Od.

America, 1875, adds Saskatchewan River to its range, but the material for this record is not mentioned.

Recently at Urbana, Illinois, through the kindness of Mr. C. A. Hart, I examined the dragonflies in the Bolter collection, now the property of the University of Illinois: and we found there five males and two females of a *Somatochlora*, all labelled Duluth, Minn., which are decidedly interesting in this connection. The appendages of the male agree with those of Harvey's male of *franklini*, fig. 1. pl. V., of my earlier paper, and the individuals from the two localities are otherwise very similar. However, I believe they are distinct, and the differences are pointed out in the following description:

Somatochlora macrotona n. sp.

Abdomen, including appendages, ♂ 41-42, ♀ 40-41; hind wing ♂ 27-28, ♀ 26-27.

In both *franklini* and *macrotona* the ♂ appendages suggest *forcipata* and *semicircularis*, and in the two species, *franklini* and *macrotona*, are indistinguishable so far as I can determine. As in *franklini* the basal spot on the hind wings in the ♂ is small and extends no farther than the anal loop, and may extend only slightly and indistinctly beyond the anal triangle. In *macrotona* this spot is paler, but the specimens may be faded by exposure to light. The only differences I am able to detect betweeen the males of the two species are in the length of the abdomen (41-42 in *macrotona* as compared with 36-37 in *franklini*), and the relative robustness of the head (7 wide in *macrotona*, 6.5 in *franklini*).

The ♀ shows the same great difference in length of abdomen when compared with *franklini* (40-41 in *macrotona*, 33 in *franklini*), and leaves no doubt as to which species deSelys had before him. The head, as in the ♂, is wider than in *franklini*.. Moreover, the female appendages of *macrotona* are 3 long, as compared with 2 in *franklini*.. In both species the vulvar lamina is a dish-shaped ellipse, reaching the end of the ninth abdominal segment. But on the second segment of the two females of *macrotona* genital lobes fully half as large as those of the male of the same species are developed. I know of no such development in any other species of *Somatochlora*. At first glance I thought the apical abdominal appendages of a female specimen had been attached by some careless student to a male individual. It is altogether unlikely that de Selys could have overlooked such a character in the two examinations he made of the ♀ type of *franklini* in the British Museum (the specimen later incorporated in his own collection). The type ♂ and ♀ of *macrotona* are in the Bolter Collection, University of Illinois, Urbana.

Some venational characters of the ♂ and ♀ of *franklini* and the 5 ♂ and 2♀ of *macrotona* have been noted. The subtriangle in hind wing is present in all. In both species M4 and Cu1 in front wing are strongly convergent, never more than 2 rows of cells between these veins beyond the first row of post trigonal cells, excepting occasionally at the extreme wing margin where there may be from 1 to 3 small cells. This character is valuable in defining groups within this genus. There is considerable variation in the distal end of the anal loop, due to the weakness of the enclosing veins, and the width at the extreme apex may vary from 2 to 4 cells. Other venational characters may be tabulated for clearness. These characters are given without any implication that specific venational differences exist between the two species. In the two the size of the wings is nearly the same, *franklini* being possibly 1 shorter. *Macrotona* has the longest abdomen, relative to alar expanse, of any species of *Somatochlora*.

CHARACTERS	*Macrotona.*		*Franklini.*	
	♂	♀	♂	♀
Triangle front wing followed by 2 rows of cells	3	4	2	2
Triangle front wing followed by 3 rows of cells	7			
Triangle hind wing followed by 2 rows of cells	8	4	2	2
Triangle hind wing followed by 3 rows of cells	2			
Triangle front wing without cross-vein (open)	4			
Triangle front wing with cross-vein	6	4	2	2
Triangle hind wing without cross-vein (open)	6	2		1
Triangle hind wing with cross-vein	4	2	2	1
Antenodals front wing	1 with 6. 8 " 7. 1 " 8.	3 with 6. 1 " 7.	1 with 7. 1 " 8.	1 with 6. 1 " 7.
Postnodals front wing	2 with 4. 4 " 5 3 " 6. 1 " 7.	4 with 5.	1 with 7.	2 with 6.
Antenodals hind wing	9 with 5. 1 " 4.	4 with 4.	2 with 5.	2 with 4.
Postnodals hind wing	3 with 6. 6 " 7. 1 " 8.	1 with 5. 3 " 6.	2 with 8.	2 with 6.

The Distribution of the North American Species of Phytonomus (Coleoptera).

By R. L. Webster, Ames, Iowa.

The home of the genus *Phytonomus* seems to be in eastern Europe, or the western part of Asia, since in that portion of the world are found the largest number of species. In this genus, and in its close ally, the European genus *Hypera,* a large number of species have been described by European systematists from eastern Europe and western Siberia, so there is little doubt that the home of the genus may safely be placed in that part of the world.

There are eleven species of this genus listed as occurring in North America, and the most common of these are *Phytonomus punctatus* Fab., *P. nigrirostris* Gyll., and *P. comptus* Say. The first two species are of European origin, having been imported into this country, where they are seriously injurious to clover. The last, *P. comptus,* seems to be a native North American species. The remaining eight species are scattered; each with a comparatively narrow range of distribution. One of these, *Phytonomus rumicis* Linn., another European species, has also been found in Massachusetts, where it is attempting to gain a foothold along the coast. In the Bolter collection of Coleoptera at the University of Illinois are eight specimens of this species taken at Nantucket Island, Mass., on vetch. Bargagli reports *P. rumicis* as occurring in northern Europe feeding on Rumex.

Phytonomus punctatus is commonly known as the "clover leaf weevil," because of its injury to clover, both in the larval and adult forms. It was described by LeConte as *P. opimus,* but LeConte's specimens were clearly the European *punctatus.* In 1881 the insect was noticed in New York, where it caused considerable injury to clover. Since that time the beetle has gradually worked westward, making its first appearance in the clover fields. In June and July, 1891, it had reached Allegheny County, Pennsylvania (Hamilton), and in June, 1893, it was found at Wooster, Ohio (F. M. Webster). In 1904

the beetle was very numerous in clover fields in the vicinity of Urbana, Illinois. There is one specimen in the old Lugger collection at the University of Minnesota labeled from Wisconsin. Dr. Fletcher reported it from Ontario, in the vicinity of Lake Ontario. To the south the species extends into North Carolina.

A single isolated occurrence of this species is at Victoria, B. C., where a few specimens were collected by a correspondent of Dr. Fletcher's. According to Hamilton the beetle is found from the southeastern part of western Siberia, westward over all Europe, even into Barbary. While the occurrence in British Columbia is probably an isolated outbreak, due to an artificial importation, there remains a possibility that the insect may be found in eastern Siberia and Alaska, and in this way connect up the distribution with Asia.

Phytonomus nigrirostris is also a species imported from Europe, but its range in North America is not so wide as that of the preceding species. It is apparently still close along the eastern coast, from Nantucket Island, Mass. (Bolter collection) to New Brunswick (Fletcher), although Schwarz reports it from Michigan. Dr. Fletcher reported this species more abundant and more destructive to clover than *Phytonomus punctatus.*

The species *P. comptus* seems to be indigenous. I have found only records from North America, and most of these from the Mississippi valley. In the Bolter collection are specimens from Illinois, Missouri, Lake Superior and New York. Other records are: Indiana (F. M. Webster), Iowa (Wickham), Colorado Springs and Dixon Canons (Wickham), Cincinnati, Ohio, and District of Columbia. LeConte also records Canada.

LeConte and also Bargagli cite *P. elongatus* Gyll. (Payk) as occurring in Greenland. In the Bolter collection there is a single specimen under this name from Northern Illinois. It is doubtful, however, that this is the correct determination of the specimen. With LeConte's original description of *Phytonomus castor,* Canada is given as a locality for its occurrence.

No other records of the species were found. *P. eximius* Lec., like *P. comptus,* is a central North American species. It has been found at Topeka, Kansas (Popenoe), Texas and Illinois (Bolter). LeConte's *P. setigerus* was described from Kansas specimens, but I have found no other record of this species. *Phytonomus quadricollis* Lec. has rather a higher range of altitude than the other species, according to the records of its occurrence. LeConte described the species from Dakota, and the Bolter collection contains specimens from Yukon, Las Vegas, New Mexico and Wyoming. *Phytonomus pubicollis* Lec and *P. seriatus* Mann. are northwestern species. LeConte gives Vancouver Island as the source of his type specimen. The Lugger collection contains a single specimen, labeled from Alaska, which I have determined as this species. Hamilton notes *P. seriatus* as occurring at Kadjak, Alaska.

Descriptions of Three New Sesiidae.

By WILLIAM BEUTENMULLER.

Sesia rhododendri sp. nov.

Male.—Head black with metallic blue black reflection, and a few white scales on each side of the face. Palpi yellow beneath, black above. Collar metallic black above, white at the sides and beneath. Antennae purple. Thorax wholly purplish or bluish metallic black. Abdomen metallic black, with a narrow yellow transverse band on the posterior edges of the second, fourth and fifth segments, and a yellow line on each side from the base to the first yellow band. Anal tuft large black, narrowly edged with yellow at the sides and yellow along the middle beneath. Thorax beneath black, with a yellow patch on each side. Abdomen beneath black, with the yellow bands on the fourth and fifth segments very broad or almost covering the segments. Legs: Anterior coxae white, slightly marked with yellow, femora purplish, tibia and tarsi yellow. Middle and posterior femora metallic purplish or bluish, yellow on the inner sides. Middle and hind tibiae metallic purple, with the spurs and tufts pale yellow. Tarsi pale yellow, scaled with black above. Wings transparent, narrowly bordered with purple along the costa inner margin and broadly margined with the same color along the outer margin. Borders with a few yellow scales. Transverse mark purple, as are also the veins. Hind wings transparent, narrowly bordered with black which appears brassy in

certain lights. Underside of fore wings with the borders golden yellow, with the veins and transverse mark like above. Expanse. 10-15 mm.

Female.—Very similar to the male in color and markings, but the transverse bands on the abdomen are broader and cover the segments beneath. Sometimes these bands are whitish at the middle beneath.

Habitat.—Cheltenham, Pa.

Described from twenty-five specimens kindly sent to me by Prof. H. A. Surface, the economic zoologist of Pennsylvania.

Sesia rhododendri is closely allied to *Sesia pyri* and *Sesia scitula,* but may be distinguished at once from these species by the absence of the yellow marking on the thorax. In *rhododendri,* the thorax is wholly metallic blue black above, while in *scitula* and *pyri* the thorax is distinctly marked with yellow along the patagia and at the posterior end. The larva of *rhododendri* infests the branches of *Rhododendron.* The types are with Prof. Surface and in the American Museum of Natural History.

Sesia utahensis sp. nov.

Female.—Head, black on the vertex; front and palpi golden yellow; collar black with a bluish reflection, edged with golden yellow in front. Antennae black with a metallic bluish lustre. Thorax brown with a broad golden yellow band along the patagiae and a spot of the same color at the junction of fore wings and thorax; posterior part of thorax edged with golden yellow hairs. Thorax beneath golden yellow. Femora golden yellow above, brown beneath; tibiae golden yellow with a broad brown band at the tip; tarsi with first joint golden yellow, remaining joints brown. Abdomen with a very broad golden yellow band at the posterior part of the second segment above and below; fourth and last segments wholly golden yellow; first, third and fourth segments brown above with a few yellow scales, beneath brown, except the fifth, which is wholly golden yellow. Anal tuft golden yellow, black at the sides and in the middle. Fore wings brown with usual transparent spaces golden yellow; hind wings golden yellow basally, brown outwardly, including the fringes. Under side of wings golden yellow slightly scaled with brown outwardly. Fringes brown. Expanse, 23 mm.

Habitat.—St. George, Washington County, Utah. June.

Described from a single female collected by Mr. George Englehardt on an expedition to Utah for the Brooklyn Institute of Arts and Sciences.

This species may be known readily by the opaque wings, and

the very broad golden yellow bands on the abdomen. It is allied to *Sesia edwardsii,* but differs from it by being larger and having differently marked abdomen and wings.

Sesia rubricincta sp. nov.

Head blue black, metallic; collar with brassy metallic lustre, edged with orange anteriorly; eyes purplish; palpi orange, last joint black above; antennae blue black. Thorax green or blue black, metallic, patagia with orange red hairs. Abdomen blackish along the back, bright red along the sides; anal tuft metallic green black, red in the middle. Thorax beneath, orange. Underside of abdomen with first and second segment, metallic blue black, remaining segment red. Legs steel blue. Fore wings steel blue black, purplish outwardly, bright red between the veins, fringes brown, slightly edged with purple. Basal transparent area narrow, outer transparent area slightly apparent, transverse mark purple with a rather large red spot; at the base of wing a bright red mark. Hind wings transparent, outer margin narrow, purple, fringes brown. Fore wings beneath similar to the above, but not so brilliant and wanting the red spot in the transverse mark at base with an orange streak at the costa. Hind wings beneath same as above. Expanse 17.50 mm.

Habitat.—Palmerlee, Cochise County, Ariz. August.

Type, one female, collection of Brooklyn Institute of Arts and Sciences, collected by Jacob Doll.

This species is closely related to *Sesia bolteri* Hy. Edwards, but is very distinct.

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Compiled by W. Paul Gerhard, C. E.
New York.

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The author of this partial bibliography would be obliged to others for bringing to his attention any omissions, corrections, or additions.

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ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., FEBRUARY, 1909.

It not infrequently takes a hundred years for humanity to fully recognize the claims of an individual to its homage, and it may take many years to have scientific facts made useful. This latter is illustrated in regard to the *Bacillus tuberculosis,* the cause of consumption, which has been known for considerably over a quarter of a century.

At the present time people are buying Red Cross Stamps to aid the so-called White Plague movement and soon will be expectorating on the sidewalk for the benefit of hungry houseflies.

Meat, fruit and vegetables are exposed for sale on the street and in the appropriate season are resorted to by this disgusting manure-bred insect, the house-fly, in large numbers. Each morning the fruit is brushed with a feather duster. The object of this is to remove street dirt composed largely of dessicated horse-manure, dried sputum, fly-specks and other interesting matter. What escapes the duster goes into the stomach of the consumer.

We spend thousands of dollars to bring a tuberculosis exhibit to town containing many things supposed to cure and in many large cities there is not even an elementary attempt at prevention.

We were recently asked why it is that entomologists were looked down upon by mammalogists, ornithologists and other naturalists, and our reply was that if the latter classes were guilty of this it is due to their pitiable ignorance. To one

who began the study of Entomology when there was no public recognition or appreciation of its value as a permissible scientific study, the meetings at Baltimore with the large attendance at the sessions of the Association of Economic Entomologists and the Entomological Society of America were most gratifying. The value of Entomology in its economic bearings will be appreciated more and more, and the time is rapidly approaching when Entomology must take a very high rank as a study of the first importance and entomologists will be second to no other body of men as searchers after scientific truth.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

When you stand collecting down under the light,
And others are standing there, too;
Remember that everything flying around,
Is not there on purpose for you.
When along comes a luna with long graceful wings,
Or a spinhx of enormous size,
If you do not *need* it give others a chance
Let some one else take it in for his prize.
And if something "rare" should alight on the ground,
And all make a rush for the spot;
With five or six nets on the poor little thing
'Twill be spoiled, much more likely than not.
And after success comes to you for a while,
And you take three or four of a kind,
Now do not be selfish but give one away,
It will pay in the end you will find.
In short have politeness wherever you are,
It is not a very hard task,
It will make your collecting more happy we know,
Just try it—'tis all that we ask!—WILLIAM PLACE, JR.

COLLECTING AT MARTHA'S VINEYARD.—While collecting at Cottage City, (now Oak Bluffs) Mass., on the island of Martha's Vineyard, in August, 1907, the writer took in a clover field 6 ♂ and 5 ♀ *Colias eurytheme.*

The specimens appeared to be freshly hatched as there was not a blemish on some of them.

All were taken in about ten days.

It could not be questioned but that the specimens had gone through

all their transformations in that field as it would have been impossible for them to have flown north and all be so fresh and perfect.

The field was always alive with *C. philodice*, but a *eurytheme* could be easily picked out at a distance of 50 yards or more.

The only satisfactory conclusion the writer could arrive at, was that some female had flown north, probably in some southeast gale, in the latter part of the previous summer, and had oviposited in the field, the late appearance of the butterflies being due to the backward season.

Some of the other captures of note on the island were *Junonia coenia*, *Erebus odora*, and *Fentonia marthesia*.

Before closing this article, I would like to state that the past season has been very unusual in Rhode Island for the number of *Junonia coenia* which have been taken and seen; the writer has taken six specimens and has authentic records of three more besides a number of others which were seen.

I should be glad to correspond with anyone who has taken *C. eurytheme*, or any other southern butterfly in the North.—WILLIAM PLACE, JR., Providence, R. I.

A NOTE ON ANTS.—During the latter part of August of this year my attention was attracted by a line of ants (*Formica subsericea*) passing along the edge of a bank in the lawn, each one carrying a wriggling, squirming fly larva. The procession was traced and found to end at a nest in the corner of the lot into which the ants disappeared with their booty. The other end was found at a swill-bucket about thirty feet away. This bucket was literally alive with a mass of *Sarcophagus* and *Tachnia* larva. There was an almost unbroken line of ants from the nest to the bucket and return but nothing like a phalanx formation.

The raid on the larvae continued uninterruptedly for three days when the bucket was cleaned by the city workmen. During this time the ants must have carried hundreds of fly larvae in all stages of development into their nest.

Mr. Arthur C. Burrill and myself then excavated the nest over an area two feet square and to a depth of about two and one-half feet, and, although many large chambers were opened the fly larvae were not found, they evidently having been carried to a greater depth. The summer had been unusually dry and ants' nests were carried down very deep to reach moisture.

Unfortunately, pressure of other work prevented my keeping as close a watch on the nest as I desired so I can give no further history of the fate of the larvae. Undoubtedly, many were consumed as food, but a few must have burrowed into the ground surrounding the chambers of the nest and there pupated, later to issue as adult flies. In the ground about the bucket many puparii were found.

The nest was visited daily, and although there seemed to be a greater

number of flies about the nest, a week later none were seen issuing from the nest entrances.

This is the first time I have observed a definite raid of *Formica* on a mass of larvae and thought this occurrence might be of interest.—GEO. P. BARTH, Milwaukee, Wis.

Doings of Societies.

The November meeting of the Heink Entomological Club occurred on the 22d at the residence of Mr. Knetzger, St. Louis, Mo., Mr. Heink presiding. Mr. Heink reported having taken *Pyrameis cardui* on November 18th in the northern part of the city. Said specimen bore all the evidence of having just emerged from the chrysalis.

Mr. Knetzger exhibited an albino specimen of *Anosia plexippus* taken September 21st, south of the city limits. The general color of this interesting insect is grayish, with black borders dotted with white, as in the normal specimen.

Mr. Kelbly commented on the scarcity of cocoons, which in past years have usually been abundant.

Mr. Meyer exhibited a wasp nest of extraordinary size, being 19 inches long and having a diameter of 13 inches. He took this near Creve Coeur Lake, Mo.

The annual election of officers of the Heink Entomological Club, St. Louis, Mo., took place December 20th at the residence of Mr. Geo. Graf, with the following result: President, Mr. Chas. L. Heink; Vice-President, Mr. Paul Schroers; Recording Secretary, Mr. Aug. Knetzger; Assistant Secretary, Mr. Julius Meyer; Treasurer, Mr. A. C. Kelbly; Librarian, Mr. Geo. Graf.

Mr. Graf exhibited a pair of *Lycaena isola* V. *alce* taken 5 miles from St. Louis. This species has probably never before been reported from here.

Mr. Schroers exhibited specimens of *Pholus vitis, Pholus labruscae, Hemeroplanes parce* and *Cocytius antaeus,* all from Florida, the latter particularly remarkable for their size.

Mr. Heink exhibited a specimen of *Phyciodes ismeria,* which he captured at Meramec Highlands, Mo., last April. This species is extremely rare here.—AUG. KNETZGER, *Secretary.*

The fourth meeting of the Entomological Society of America was held in Baltimore, December 30th and 31st, in affiliation with the American Association for the Advancement of Science and other Societies. The number in attendance was exceptionally large.

The sessions were called to order on Wednesday morning by the President, Dr. Wm. Morton Wheeler. The report of the committee on nomenclature was received. It will be printed in the "Annals" and brought up for discussion next year. Appropriate minutes were adopted in regard to the deaths of Drs. Ashmead and Fletcher, and the deaths of Messrs. C. A. Davis, A. Craw, and A. V. Taylor were also announced by the Chair. The election of the following Fellows was announced: E. P. Felt, S. W. Williston, A. D. MacGillivray, T. D. A. Cockerell, E. D. Ball and also the election of thirty-nine members.

The following suggestion was considered and referred to the Committee on Nomenclature: "That the Entomological Society of America should undertake to get out a list of all names of insects to be used as a standard code like the A. O. U. code." The following resolution was adopted and referred to the Executive Committee with power to act: "That it is the sense of the Society that the duty on insects is objectionable and should be abolished."

An amendment to the constitution was proposed, to be voted on at the next meeting, abolishing the present requirement that officers shall be chosen only from the list of Fellows. An additional by-law was adopted as follows: 6. "Any member may become a life member upon payment of $50 at one time, and shall be exempt from further assessments. He shall receive during his life one copy of each issue of the Annals."

The following officers were elected:

President, Dr. Henry Skinner.

First Vice-President, Prof. Herbert Osborn.

Second Vice-President, Dr. A. D. Hopkins.

Secretary-Treasurer, J. Chester Bradley.

Additional members of the Executive Committee: Prof. J. H. Comstock, Dr. John B. Smith, Dr. W. M. Wheeler, Rev. Prof. C. J. S. Bethune, Mr. E. A. Schwarz, Prof. Lawrence Bruner.

Standing Committee on Nomenclature, for three years, Dr. E. P. Felt, to succeed himself.

Member of the Editorial Board, to fill the vacancy caused by the death of Dr. Fletcher, Rev. Prof. C. J. S. Bethune.

On Wednesday afternoon a joint session with Section F, A. A. A. S., was held, at which Dr. John B. Smith presided. At both this and the following session of Thursday, very full and interesting programs of papers were read.

The sessions closed with an exceedingly interesting address on Thursday evening by Dr. E. B. Poulton, Hope Professor of Zoology in Oxford University, England, on "Mimicry in the butterflies of North America." The address was illustrated by many beautiful lantern slides, and was attended by a large and appreciative audience. It, and also the full minutes of the sessions, will be published in the "Annals of the Entomological Society of America."

The Brooklyn Entomological Society met at 55 Stuyvesant Avenue in December, 1908, with thirteen members present.

Acquisitions to the collection of photographs of eminent entomologists included those of B. Neumoegen, Herman Strecker and Harry Edwards.

Mr. Franck read a letter from a collector who is spending three years in Celebes. He mentioned the extreme scarcity of species of *Ornithoptera* and the meagre variety of *Papilio*. He had great difficulty in engaging natives to collect for him on account of their dishonesty.

Messrs. Engelhardt and Dow spoke of their collecting experiences in Claremont, N. H., last June. In the first three evenings sixteen species of Sphingidae were captured at the arc lights. During a two weeks' stay about 55 species of Geometridae were taken. There was a good variety of Heterocampids. The moths which flocked to the lights in the greatest numbers were *Actias luna, Anisota rubicunda, Hypercheiria io,* and *Biston cognataria. Cecropia* and *polyphemus* were common, but *promethia* does not inhabit the region. Great numbers of *Necrophorus americanus* came to the lights. At the end of June or

early July there are generally the few sultry nights of the year. At this time the Dytscidae fly in great numbers, but at no other times during the season.

On account of the great amount of cut pine on the hillsides *Monohammus scutellatus* is about the commonest beetle.

Basilarchia astyanax is not common even at 480 feet elevation. On the hills 1500-1700 feet *arthemis* were in great plenty. The common *Argynnis* is *atlantis*. *Chrysophanus thoe* occurs more frequently than *hypophleas*. *Grapta progne* is as abundant as *interrogationis*. *Feneiseca tarquinius* is common as an adult.

Cicindela were very scarce, a few 6-*guttata* and one *repanda* being seen.

Prof. J. B. Smith exhibited a faunal map of New Jersey, which is to appear in the forthcoming edition of the "Insects of New Jersey": Its main divisions are: The coastal strip, which takes in all of Cape May peninsula, but narrows to the northward and disappears below Long Branch; the pine barrens which include the inland everywhere from a point above Lakewood south to the marshes; the Piedmont Plain, which equals the red shale belt, the highland region, from the Orange Mountains northward; and the Appalachian strip, small in extent and northeast of the Delaware Water Gap.

R. P. Dow, *Recording Secretary.*

OBITUARY.

Mr. Samuel Auxer, of Lancaster, Pennsylvania, died on January 6th last. He was born near Elizabethtown seventy-four years ago. In early years he was a plane maker, but later became engaged in the book and stationery business. Mr. Auxer was a great lover of books, but probably loved nature better. He was an ardent collector of entomological specimens and had a large collection and exchanged with many scientists in America and Europe. He was a valued citizen of his town and had the respect of many persons, who admired him for his modesty and knowledge of nature in general. He is survived by his wife, but had no children.

EXCHANGES.

Not Exceeding Three Lines Free to Subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted for Cash or exchange living pupae *Papilio turnus, troilus, philenor* at 5c. each; *excaecatus, geminatus, myops* at 5c. each; *modesta* 10c. each; *lineata* at 5c., *jorulla* at 7c., *Dat. nimistra* at 5c.—A. F. Porter, Decorah, Iowa.

I have larvae of *Catocala illecta* feeding on honey-locust, and shall have chrysalids in a few weeks. From eggs of *C. piatrix* and *C. vidua* shall soon have larvae. Larvae of other later. Want *C. parta* and *C. amatrix*.—R. R. Rowley, Louisiana, Mo.

Lepidoptera Wanted.—Catocala, Papilio, Arctians and other showy specimens of larvæ. Will send equally good things in return.—G. Eberhard, Berlin, Friedenau, Beckerstrasse t. Germany.

I offer bred Gortynas, fine butterflies, chrysalids of butterflies, hawkmoths, etc., and *Catocala* and other eggs. I want *Catocala* eggs, chrysalids of *ajax, turnus, asterias, troilus, cresphontes*, etc., or of any butterfly or hawkmoth or offers welcomed.—J. W. H. Harrison, 181 Abingdon Rd., Middlesbro', England.

I want to buy cocoons of *A. luna, A. angulifera* and *gloveri*. Pupae of *P. achemon* and *D. lineata*. Please state prices.—Sydney L. Wright, Jr., Logan, Philadelphia.

Fresh mounted examples of Macro- and Micro-lepidoptera from this locality offered in exchange for Macro-lepidoptera of North America new to my collection.—Fred. Marloff, Oak Station P. O., Alleg. Co., Pa.

Geometridae.—Will exchange or pay cash. Wanted especially in series *Euphthecias* from Maine and the Provinces, Canada and the Northwest, also western, southwestern and southern forms.—Address R. F. Pearsall, 1334 Dean St., Brooklyn, N. Y.

Liberal exchange in European and Missouri Lepidoptera for exotics and natives not in my collection.—Aug. Knetzger, 3822 McDonald St., St. Louis, Mo.

Fertile eggs of *Catocala ilia, neogama, piatrix, robinsoni, vidua, retecta, innubens, cara* and *amatrix*. For sale or exchange.—George M. Dodge, Louisiana, Mo.

Specimens of Lepidoptera for exchange from this locality.—Fred. Burns, 636 Center St., Reno, Nevada.

Lepidoptera from the State of Missouri. Papered specimens in good condition. Write for list.—F. Malkmus, 4398½ G Gilson Avenue, St. Louis, Mo.

Wanted for cash or exchange Meloidae, especially of genus *Meloe*, from North America north of Mexico.—R. W. Dawson, Dept. Ent., Univ. of Neb., Lincoln, Nebraska.

Lepidoptera.—I would like to correspond with those who expect to collect for cash in new and little known regions, South and West, during the coming season.—John L. Healy, 312 City Hall, Chicago, Ill.

I'll be happy in corresponding and exchanging papers and material of study with economic entomologists, and especially with Miriopodologists and Acarologists.—Prof. Carlos E. Porter, Casilla 2352, Santiago, Chile.

For Exchange.—A subscription to the Macrolepidoptera of the world by Seitz. All parts complete to date.—Chris. E. Olsen, No. 1 Jefferson Ave., Maspeth, L. I., N. Y.

Some Entomological Literature for exchange.—M. Bubna, 2629 Woodhill Rd., Cleveland, Ohio.

Wanted for Cash or Exchange.—Cocoons and pupae: *Pap. ajax, troiulus, cresphontes, achemon, turnus* and other *Papilio. T. modesta, H. chersis, luscitiosa, A. bicolor, angelica, P. pandorus, Dar. versicolor, Cal. astylus, Cit. regalis, imperialis, hylacus, luna, polyphemus, Lapara coniferarum, C. nudulosa, S. germinatus, Paonias myops, P. quinquanmaculata, Attacus cecropia, jorulla, orizaba. angulifera* and all other species of *Attacus.*—Joseph Sever, 335 E. 49th St., New York City.

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